PB-216 873

SUMMARY REPORTS OF CO-OPERATIVE INDUSTRIAL WASTE SURVEYS FOR INTERNATIONAL JOINT COMMISSION

Dean M. Taylor

Environmental Health Center
Cincinnati, Ohio

June 1953

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PB 216 873

SUMMARY REPORTS

OF

CO-OPERATIVE INDUSTRIAL WASTE SURVEYS

FOR

INTERNATIONAL JOINT COMMISSION

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SANITARY ENGINEERING CENTER
CINCINNATI, OHIO

APRIL - JUNE, 1953

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By

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COOPERATING INDUSTRIES

1.	Chemical Products Division Archer-Daniels-Midland Co.	Wyandotte, Mich.
2.	Darling & Company	Melvindale, Mich.
3.	Detroit Sulphite Pulp and Paper Co.	Detroit, Mich.
4.	Port Huron Sulphite and Paper Co.	Port Huron, Mich.
5.	Steel Products Division Firestone Tire & Rubber Co.	Riverview, Mich.

ACKNOWLEDGMENT

Preliminary arrangements for these cooperative studies were made by Mr. F. B. Frost, sanitary engineer with the Michigan Water Resources Commission.

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INDUSTRIAL WASTE SUMMARY REPORT

1. Industry - Chemical Products Division of Archer-Daniels-Midland Company

2. Location - 4655 Biddle Street, Wyandotte, Michigan.

3. Products - Hydrogenated glycerides and fatty acids, free fatty acids, and glycerine. Production is approximately one million pounds per week.

4. Water Supply - A. Sanitary - Wyandotte city water

   B. Process - Wyandotte city water and Detroit River water.

5. Sanitary Wastes - Wyandotte municipal sewer system.

6. Process Wastes - Detroit River

7. Date of Last Survey - April 28 to May 5, 1953.

8. Characteristics of Liquid Wastes Discharged from Plant- Average, Net Values

COMPARISON OF 1947 and 1953 SURVEY DATA

Waste Constituent	Concentrations PPM		Quantities Lbs/Day		Unit Quantities Lbs/ton Product
	1947	1953	1947	1953	1953
Flow - MGD			.803	1.13	11,300 Gal/Ton Product
	1947	1953	1947	1953	1953
B.O.D.	340	220	3050	2020	20
Total Solids	1420	350	12,300	3290	33
Total Vol. Matter	1130	180	9560	1660	17
Suspended Solids	620	150	4620	1420	14
Suspended Vol. Matter	570	140	4280	1320	13
Oils	1000	130	6700	1240	12

(Chem. Prod. Div. of Archer-Daniels-Midland Co., Continued)

9. Comments - (1) The reductions in residual pollution reaching the boundary waters from this plant noted since the previous survey (see COMPARISON OF 1947 and 1953 SURVEY DATA on previous page) are primarily due to improvements in the plant trap system. The original small traps in the system have been supplemented with a relatively large separator consisting of two parallel sections of equal capacities (each section 23' x 10' 8" x 7' deep). Approximately 91 per cent of the total waste volume passes through this settling basin. The only other waste line of any significance discharges directly to an outfall sewer.

(2) Influent design is such that flows through the 2 sections of the main separator are unequal. Moreover, the bottom baffles have been removed. Average waste removal efficiencies during the period of the survey are as follows:

Waste Constituent	East Section	West Section	Total (average)
Flow - MGD	.60	.43	1.03
B.O.D.	9%	60%	30%
Suspended Solids	15%	65%	36%
Oils	21%	70%	42%

Improvement in the over-all efficiency of the trap should result, if the flows in the two sections are equalized by properly adjusting the baffles.

(3) Suspended solids in the wastes are represented by soaps and oils for the most part and constitute lost products.

10. Plans for Changes in Process and/or Waste Reduction Measures

(1) Reconstruction of bottom baffles in main separator.

(2) Readjustment of top baffles in main separator

INDUSTRIAL WASTE SUMMARY REPORT

1.	Industry	Darling and Company
2.	Location	3350 Greenfield Road, Melvindale, Michigan
3.	Products	Fats, bone meals, and tankage
4.	Water Supply	A. Sanitary - Melvindale city water
		B. Process - Rouge River, coarse screening only
5.	Sanitary wastes	Melvindale municipal system
6.	Process wastes	Rouge River
7.	Date of last survey	Samples collected on May 6, 7, 8, 14, & 25, 1953
8.	Characteristics of liquid wastes discharged from plant	Average, net values

Comparison of 1947 and 1953 Survey Data

Waste Constituent	Concentrations ppm		Quantities lb/day	
	1947	1953	1947	1953
Flow, MGD			1.16	1.27
B.O.D. - 5 day	800	121	7,750	1,280
Total Solids	520	48	5,030	510
Total Volatile Matter	460	32	4,450	350
Suspended Solids	500	45	4,840	480
Suspended Volatile Matter	500	31	4,840	330
Oils	98	34	950	470

(Darling and Company, Continued)

9. Comments

(1) The reductions in residual pollution reaching the boundary waters from this plant noted since the previous survey (see COMPARISON OF 1947 and 1953 SURVEY DATA above) are due to improvements in the cookers. Formerly, the rendering of the raw materials had been done in jacketed cookers operated under a vacuum. The steam from the mixture went to condensers and the condensate discharged to the settling basins. If a cooker was overloaded or otherwise operated improperly some of the materials in the cooker were drawn through the condensers and discharged with the waste.

Changes were made during the period between the two surveys to convert all of the cookers to operate at atmospheric pressure and hence eliminate the possibility of undesirable materials escaping to the plant waste system. Under the present setup, a vacuum of approximately 1 inch is pulled on the vat at the end of the cook with a barometric condenser.

(2) Approximately 93 per cent of the total solids are suspended; approximately 95 per cent of the total volatile matter is represented by suspended volatile matter, indicating that most of the organic matter is in suspension.

10. Plans for changes in process and/or waste reduction measures — None.

INDUSTRIAL WASTE SUMMARY REPORT

1.	Industry	Detroit Sulphite Pulp & Paper Co.
2.	Location	9125 W. Jefferson Ave., Detroit, 17, Michigan.
3.	Products	Wood pulp and paper
4.	Water supply	A. Sanitary - Detroit city water B. Process - Zug channel of Detroit River, treated with chemicals, filtered through rapid sand filters, and chlorinated for slime control.
5.	Sanitary wastes	Zug channel, Detroit River
6.	Process wastes	Zug channel, Detroit River
7.	Date of survey	May 11 through May 14, 1953
8.	Characteristics of liquid wastes discharged from plant	Average, net values (No previous survey).

	Concentrations	Quantities	Unit Quantities
Flow		27. MGD	172,000 gal/ton paper
B.O.D. - 5-day	450 ppm	101,000 lb/day	647 lb/ton paper
Total solids	2,320 ppm	520,000 lb/day	3,330 lb/ton paper
Total volatile matter	1,350 ppm	304,000 lb/day	1,940 lb/ton paper
Suspended solids	100 ppm	23,400 lb/day	149 lb/ton paper
Suspended vol.matter	87 ppm	19,600 lb/day	125 lb/ton paper
pH	5.8 - 8.0		

9. Comments

(1) This plant produces wood pulp by the sulphite (Mitscherlich) process.

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9. Comments

(2) 77 per cent of total B.O.D. results from spent digester liquor.

(3) 64 per cent of the total solids result from spent digester liquor. 99.8 per cent of these solids are dissolved and 55 per cent volatile.

(4) 63 per cent of the suspended solids come from the paper mill. 74 per cent of these solids are volatile. If volatile suspended solids are taken to indicate fiber, then approximately 7.25 net tons of fiber are discharged daily from the paper mill. This is equivalent to 0.62 pound per thousand gallons wastes, or 4.6 per cent net fiber loss (based on 157 tons paper/day). Paper mill wastes include screen room and bleaching wastes from the pulp mill, so these losses cannot be strictly charged to the paper mill.

(5) Save-alls have been installed in the screen room, bleach plant, and on all paper machine effluents. Approximately 50 per cent of all white paper is re-used. Greater use is not employed because pitch interferes with production of high quality paper.

(6) All process wastes flow through a small settling pond. The only significant waste reduction, however, is in suspended solids, being 15 per cent.

10. Plans for changes in process and/or waste reduction measures. None.

INDUSTRIAL WASTE SUMMARY REPORT

1.	Industry	Port Huron Sulphite and Paper Co.
2.	Location	Port Huron, Michigan
3.	Products	High-grade paper, approximately 64 tons per day
4.	Water Supply	A. Sanitary - Port Huron city water
		B. Process - St. Clair River
5.	Sanitary Wastes	Black River
6.	Process Wastes	Black River
7.	Date of last survey	May 20 through May 27, 1953
8.	Characteristics of liquid wastes discharged from plant	Average, net values

Comparison of 1951 and 1953 Survey Data

Waste Constituent	Concentrations ppm		Quantities lb/day		Unit Quantities lb/ton Paper
	1951*	1953	1951*	1953	1953
Flow, MGD			9.18	7.69	147,000
B.O.D. - 5-day	55	17	4,140	2,890	54
Total Solids	410	290	32,300	17,500	324
Total Volatile Matter	250	150	18,800	9,320	173
Suspended Solids	250	210	19,500	13,000	241
Suspended Volatile Matter	180	120	14,200	7,580	140

* Survey did not include flue ash wastes. It was assumed that they were the same as for the 1953 survey and they were added to the 1951 results.

(Port Huron Sulphite & Paper Co., Continued)

9. Comments

(1) Both the 1951 and 1953 surveys were made subsequent to the discontinuance of pulping operation at this plant.

(2) The reductions in pollutional load discharged from this plant since the previous survey (see COMPARISON OF 1951 and 1953 SURVEY DATA on previous page) must be credited to the substantial modernization program undertaken by the management, embracing the latest equipment available and a very impressive automatic control system.

(3) Save-alls are installed on all paper machine effluent lines and also in the bleached unit, but maximum white water re-use is not employed because of pitch problems on the high-grade paper.

(4) Liquid wastes are discharged from six sewers to the Black River. One sewer carries only ashes sluiced from the boiler house.

(5) Flue ash wastes constitute only about 3 per cent of the total flow, but contribute 50 per cent of the total solids and 55 per cent to the suspended solids being discharged from the plant.

(6) Taking suspended volatile matter to represent fiber, and excluding flue ash wastes, fiber losses from the plant were 4.1 per cent of production.

(7) Under quiescent condition (i.e., in a graduated cylinder in a laboratory) large portion of the suspended solids in not only the flue ash wastes but also in the other portions of the plant wastes were obtained in settling period of two hours.

10. Plans for changes in process and/or waste reduction measures — None

INDUSTRIAL WASTE SUMMARY REPORT

1. Industry - Steel Products Division of Firestone Tire & Rubber Co.

2. Location - Riverview, Michigan

3. Products - Steel Products - auto rims, stampings, cabinets, and fuel tanks.

4. Water Supply - A. Sanitary - Wyandotte city water

   B. Process - Detroit River water

5. Sanitary Wastes - Wayne County sewers

6. Process Wastes - Detroit River

7. Date of Survey - May 4, 5, 8, 9, 10, 11, and 14, 1953

8. Characteristics of Liquid Wastes Discharged from Plant- Average, Net Values (No previous survey)

	Concentrations	Quantities	Unit Quantities
Flow		1.5 MGD	4470 Gal/Ton Product
B.O.D. - 5 day	52 ppm	650 Lbs/Day	2.0 Lbs/Ton Product
Total Solids	2550 ppm	31,900 Lbs/Day	95 Lbs/Ton Product
Total Vol. Matter	1610 ppm	20,100 Lbs/Day	60 Lbs/Ton Product
Suspended Solids	32 ppm	400 Lbs/Day	1.2 Lbs/Ton Product
Suspended Vol. Matter	31 ppm	390 Lbs/Day	1.2 Lbs/Ton Product
Oils	30 ppm	380 Lbs/Day	1.2 Lbs/Ton Product
Acidity			
Methyl Orange	990 ppm	12,400 Lbs/Day	37 Lbs/Ton Product
Phenolphthalein	1700 ppm	21,200 Lbs/Day	63 Lbs/Ton Product
Total Iron	500	6,200 Lbs/Day	18 Lbs/Ton Product
pH	2.0 - 2.5		

(Steel Prod. Div. of Firestone Tire & Rubber Co., continued)

9. Comments - (1) The most objectionable wastes are:
(A) Pickling wastes, containing sulfuric acid and iron salts, which are dumped periodically.
(B) Oily wastes primarily from metal coating operations.
(Plating wastes are held to a minimum. The contents of the hot and cold water rinses in the plating lines are discharged to the county sewer system with the sanitary wastes.)

(2) Waste treatment facilities consist of two oil separators, operating alternately in parallel, and three settling-skimming basins, operating in series, followed by a diffusion system to the river.

(A) The oil separators are each 7' 8" x 20' in plan with a normal water depth of 8.3'. A submerged baffle runs across the center of each unit at right angles to the direction of flow. Approximately 2500 gallons of oil are recovered per month.

(B) Separator effluent flows through two small settling-skimming ponds in series with a larger pond with a capacity of 600,000 gallons.

(C) The outfall consists of a 16" diameter pipe of 175' length with a diffusion system of eighteen 3-1/2" risers, each 3-1/2' long, spaced 6 feet apart in the last 125' of the outfall pipe.

The above improvements in the treatment facilities have been made since 1947. Treatment is predicated on obtaining the in-plant dilution of concentrated wastes by the system of settling basins (equalization of the waste discharged from the plant) and taking maximum advantage of the dilution capacity of the receiving water by the outfall diffusion system.

The skimming-settling basins also serve to recover oil which together with acidity and iron is the major pollution problem at this plant.

(3) Considering that the pickling wastes are dumped in batches, the final effluent from this plant appears very uniform in composition. However, the concentrations of oils and iron and the pH of the plant wastes at the head end of the outfall system are higher than the suggested ppm values which appear in the Objectives for Boundary Waters Quality Control (IJC).

10. Plans for Changes in Process and/or Waste Reduction Measures — Plant Engineer desires that a river survey be conducted at a later date to evaluate the effect of the diffusion system.

I. J. C.

Analytical Results-St.Clair River (Sampling Point closest to Canadian Shore)

Phenols, ppb

Range	Distance from West Shore	Canadian No. Comparable	Date 1946	U.S. Data	Canadian Data
SR-39.0	1500'	#1	1946 Sept. 30	-	10
			Oct. 3	-	0
Control Range			Nov. 9	-	0
			Nov. 6	0	2
Can.shore at	1650'		Nov. 19	-	0
			Nov. 21	-	-
			1947		
			June 25	0	-
			June 29	0	-
			July 9	0	2
			July 10	0	-
			Aug. 26	0	-
			Aug. 27	0	
			Sept. 15	0	
			Sept. 16	0	
			Sept. 17	0	
			Sept. 18	0	
Average				0	2
Maximum				0	10
Minimum				0	0
No. of Samples				11	6
			1946		
SR-37.7	1600'	#4	Sept. 30	-	2
			Oct. 3	-	5
Can. Shore at	1700'		Oct. 7	-	15
			Oct. 9	-	0
			Oct. 15	-	0
			Nov. 6	0	0
			Nov. 12	-	4
			Nov. 15	0	-
			Nov. 19	0	15
			Nov. 20	0	-
			Nov. 25	0	-
			Nov. 28	-	0
			Dec. 4	-	2
			Dec. 5	-	4
			1947		
			June 25	0	
			June 26	7	
			July 7	-	0
			July 9	0	
			July 10	0	

I. J. C.

Analytical Results-St. Clair River (Sampling Point closest to Canadian Shore)

Phenols, ppb

Range	Distance from West Shore	Canadian No. Comparable	Date 1946	U.S. Data	Canadian Data
			1947		
SR-37.7	1600'	#4	Aug. 26	0	-
			Aug. 27	0	-
Can. Shore at	1700'		Sept.15	0	-
			Sept.16	0	-
			Sept.17	0	-
			Sept.18	0	-
Average				<1	4
Maximum				7	15
Minimum				0	0
No. of Samples				14	12
			1946		
SR-35.4	1400'	#9	Sept. 26	-	15
			Sept. 30	-	0
Can. Shore at	1600'		Oct. 3	-	5
			Oct. 7	-	10
			Oct. 9	-	0
			Oct. 15	-	0
			Oct. 21	-	-
			Nov. 6	0	0
			Nov. 7	0	-
			Nov. 8	0	-
			Nov. 12	-	1
			Nov. 15	0	
			Nov. 18	0	
			Nov. 19	0	
			Nov. 20	0	5
			Nov. 21	-	-
			Nov. 28	-	15
			1947		
			June 25	7	0
			June 26	0	-
			July 9	0	-
			July 10	0	-
			Aug. 26	0	-
			Aug. 27	8	-
			Sept. 15	5	-
			Sept. 16	0	-
			Sept. 17	0	-
			Sept. 18	0	-
Average				1	5
Maximum				8	15
Minimum				0	0
No. of Samples				17	10

I. J. C.

Analytical Results-St. Clair River (Sampling Point closest to Canadian Shore)

Phenols, ppb

Range	Distance from West Shore	Canadian No. Comparable	Date 1946	U.S. Data	Canadian Data
			1946		
SR-31.2	1900'	#14	Sept. 26	-	4
			Sept. 30	-	0
Can. Shore at	2200'		Oct. 3	-	4
			Oct. 7	-	30
			Oct. 9	-	10
			Oct. 15	-	0
			Nov. 6	-	12
			Nov. 7	0	-
			Nov. 12	-	3
			Nov. 15	0	-
			Nov. 18	0	-
			Nov. 19	0	-
			Nov. 20	0	-
			Nov. 25	0	-
			Nov. 26	0	-
			Nov. 28	-	4
			1947		
			June 24	7	-
			June 25	7	-
			June 26	7	-
			July 8	18	4
			July 9	5	-
			July 10	5	-
			Aug. 26	40	-
			Aug. 27	48	-
			Sept. 15	5	-
			Sept. 16	0	-
			Sept. 17	6	-
			Sept. 18	0	-
Average				8	7
Maximum				48	30
Minimum				0	0
No. of Samples				19	10
			1946		
SR-30.1E	900'	#19	Sept. 26	-	2
			Sept. 30	-	0
Can. Shore at	1100'		Oct. 3	-	8
			Oct. 7	-	0
			Oct. 9	-	4
			Nov. 6	-	0
			Nov. 12	0	-
			Nov. 14	-	15
			Nov. 18	0	-
			Nov. 20	-	2

I. J. C.

Analytical Results-St.Clair River (Sampling Point closest to Canadian Shore)

Phenols, ppb

Range	Distance from West Shore	Canadian No. Comparable	Date 1946	U.S. Data	Canadian Data
SR-30.1E	900'	#19	Nov. 26	0	-
			Nov. 29	-	4
Can. Shore at	1100'		1947		
			June 24	0	-
			July 8	5	-
			July 17	-	15
			Aug. 26	45	-
			Aug. 27	50	-
			Sept.15	0	-
			Sept.16	140	-
			Sept.17	0	-
			Sept.18	0	-
Average				23	5
Maximum				140	15
Minimum				0	0
No. of Samples				11	10
			1946		
SR-26.7	1900'	#25	Sept.26	-	20
			Sept.30	-	2
Can. Shore at	2500'		Oct. 3	-	70
			Oct. 7	-	6
			Oct. 9	-	0
			Nov. 6	-	0
			Nov. 12	0	
			Nov. 14		4
			Nov. 19	0	
			Nov. 29	-	4
			Dec. 4	-	0
			Dec. 5	-	6
			Dec. 10	-	2
			Dec. 11	-	2
			1947		
			June 24	7	-
			July 8	10	-
			July 17		30
			Aug. 26	32	-
			Aug. 28	20	-
			Sept.15	0	-
			Sept.16	2	0
			Sept.17	12	0
			Sept.18	0	-
Average				7	11
Maximum				32	70
Minimum				0	0
No. of Samples				10	13

I. J. C.

Analytical Results-St.Clair River (Sampling Point closest to Canadian Shore)

Phenols, ppb

Range	Distance from West Shore	Canadian No. Comparable	Date 1946	U.S. Data	Canadian Data
			1947		
SR-24.2	2000'	None	Sept. 15	0	-
			Sept. 16	15	-
Can. Shore at	2100'		Sept. 17	0	-
			Sept. 18	0	-
			1946		
SR-17.5	2600'	#30	Sept. 24	-	4
			Sept. 26	-	80
Can. Shore at	3300'		Oct. 1	-	0
			Oct. 4	-	20
			Oct. 8	-	12
			Nov. 7	-	4
			Nov. 12	0	-
			Nov. 14	-	0
			Nov. 20	-	2
			Nov. 29	-	2
			Dec. 4	-	0
			Dec. 5	-	2
			Dec. 10	-	0
			1947		
			June 24	0	-
			June 27	0	-
			July 8	10	-
			July 17	-	20
			Aug. 25	15	-
			Aug. 28	24	-
			Sept. 15	25	-
			Sept. 16	0	-
			Sept. 17	17	-
			Sept. 18	80	-
Average				17	13
Maximum				80	80
Minimum				0	0
No. of Samples				10	13
			1946		
SR-16.2	2500'	#35	Sept. 24	-	4
			Sept. 26	-	20
Can. Shore at	3000'		Oct. 1	-	2
			Oct. 4	-	175
			Oct. 8	-	2
			Nov. 7	-	0
			Nov. 13	0	
			Nov. 14	-	5

I. J. C.

Analytical Results-St.Clair River(Sampling Point closest to Canadian Shore)

Phenols, ppb

Range	Distance from West Shore	Canadian No. Comparable	Date 1946	U.S. Data	Canadian Data
SR-16.2	2500'	#35	1947		
			June 24	7	-
Can. Shore at	3000'		June 27	7	-
			July 8	5	-
			July 10	12	-
			July 17	-	4
			Aug. 25	15	4
			Aug. 28	17	4
			Sept.15	0	-
			Sept.16	0	-
			Sept.17	0	-
			Sept.18	12	-
Average				7	26
			1946		
SR-13.7	1900'	#40	Sept. 24	-	15
			Oct. 1	-	2
Can. Shore at	2000'		Oct. 4	-	5
			Oct. 8	-	10
			Nov. 7	-	0
			Nov. 13	0	
			Nov. 14	-	0
			Nov. 20	-	0
			Nov. 29	-	2
			Dec. 4	-	2
			Dec. 5	-	2
			Dec. 10	-	0
			Dec. 11	-	0
			1947		
			May 20	-	-
			May 24	-	-
			June 11	17	-
			June 23	4	-
			June 27	12	-
			July 7	7	-
			July 10	0	-
			July 18	-	6
			Aug. 25	20	6
			Aug. 28	15	-
			Sept. 15	0	-
			Sept. 16	35	-
			Sept. 17	0	-
			Sept. 18	0	-

I. J. C.

Analytical Results-St.Clair River (Sampling Point closest to Canadian Shore)

Phenols, ppb

Range	Distance from West Shore	Canadian No. Comparable	Date 1946	U.S. Data	Canadian Data
SR-13.7	1900'	#40	1947		
			Oct. 30	0	
Can. Shore at	2000'		Nov. 4	0	
			Nov. 5	0	
Average				7	3
Maximum				35	15
Minimum				0	0
No. of Samples				15	13
			1946		
SR-10.0$	900'	#51	Sept. 24	-	8
			Oct. 4	-	410
Can. Shore at	1500'		Oct. 8	-	15
			Nov. 7	-	0
			Nov. 13	0	
			Nov. 14	-	0
			Nov. 21	-	4
			Nov. 22	-	15
			Dec. 4	-	0
			Dec. 5	-	4
			Dec. 11	-	0
			1947		
			June 23	10	-
			June 27	7	-
			July 7	7	-
			July 18		2
			Aug. 25	4	-
			Aug. 28	28	-
			Sept. 15	0	-
			Sept. 16	0	-
			Sept. 17	12	-
			Sept. 18	0	-
			Oct. 27	0	-
Average				6	42
Maximum				28	410
Minimum				0	0
No. of Samples				10	12

I. J. C.
St.Clair River
Phenols in ppb
at
Points Next to Canadian Shore

Range	Distance from West Shore	Canadian Station No. Comparable		U.S. Data	Canadian Data	Combined Data
SR-39.0	1500'	#1	Ave.	0	2	<1
			Max.	0	10	10
Can. Shore at	1650'		Min.	0	0	0
			No. of Samples	11	6	17
SR-37.7	1600'	#4	Ave.	<1	4	2
			Max.	7	15	15
Can. Shore at	1700'		Min.	0	0	0
			No. of Samples	14	12	26
SR-35.4	1400'	#9	Ave.	1	5	3
			Max.	8	15	15
Can. Shore at	1600'		Min.	0	0	0
			No. of Samples	17	10	27
SR-31.2	1900'	#14	Ave.	8	7	8
			Max.	48	30	48
Can. Shore at	2200'		Min.	0	0	0
			No. of Samples	19	10	29
SR-30.1E	900'	#19	Ave.	23	5	14
			Max.	140	15	140
Can. Shore at	1100'		Min.	0	0	0
			No. of Samples	11	10	21
SR-26.7	1900'	#25	Ave.	7	11	10
			Max.	32	70	70
Can. Shore at	2500'		Min.	0	0	0
			No. of Samples	10	13	23
SR-24.2	2000'	None	Ave.	4	-	4
			Max.	15	-	15
Can. Shore at	2800'		Min.	0	-	0
			No. of Samples	4	-	4
SR-17.5	2600'	#30	Ave.	17	13	14
			Max.	80	80	80
Can. Shore at	3300'		Min.	0	0	0
			No. of Samples	10	13	23
SR-16.2	2500'	#35	Ave.	7	26	15
			Max.	17	175	175
Can. Shore at	3000'		Min.	0	0	0
			No. of Samples	11	8	19

I. J. C.
St.Clair River
Phenols in ppb
at
Points Next to Canadian Shore

Range	Distance from West Shore	Canadian Station No. Comparable		U.S. Data	Canadian Data	Combined Data
SR-13.7	1900'	#40	Ave.	7	3	6
			Max.	35	15	35
Can. Shore at	2000'		Min.	0	0	0
			No. of Samples	15	13	28
SR-10.08	900'	#51	Ave.	6	42	24
			Max.	28	410	410
Can. Shore at	1500'		Min.	0	0	0
			No. of Samples	11	11	22